

WHAT IS CLAIMED IS:

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1. An electrically controlled braking system including an electrically controlled brake for braking a wheel of an automotive vehicle, an electric power source device, a brake operating member, and a brake control apparatus [for controlling an electric energy to be supplied from said electric power source device to said brake, for thereby controlling an operation of said brake, when said brake operating member is operated, said braking system comprising:

a switching device disposed between said electric power source device and said brake control apparatus, said switching device being turned on for connecting said electric power source device to said brake control apparatus, [in response to an operation of said brake operating member.]

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2. An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a rotor rotating with said wheel, a friction member, and an electric motor for forcing said friction member onto said rotor, and said brake control apparatus includes a motor control device for controlling the electric energy to be supplied from said electric power source device to said electric motor.

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3. ~~The~~ An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a rotor rotating with said wheel, a friction member, and an electrically operated actuator for forcing said friction member on to said rotor, said switching device is disposed between said electric power source device and said actuator.

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4. ~~The~~ An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a rotor rotating with said wheel, a friction member, and an electrically operated actuator for forcing said friction member onto said rotor, said braking system further comprising another switching device disposed between said electric power source device and said actuator, said another switching device being turned on to connect said electric power source device to said actuator in response to an operation of said brake operating member.

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5. ~~The~~ An electrically controlled braking system according to claim 1, wherein said switching device includes a plurality of switches connected in series with each other.

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6. ~~The~~ An electrically controlled braking system according to claim 1, wherein said brake control apparatus includes a plurality of control devices each of

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which is principally constituted by a computer, and said electric power source device includes a plurality of electric power sources corresponding to said plurality of control devices, respectively.

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7. ^{The} An electrically controlled braking system according to claim 6, wherein said plurality of control devices are substantially identical with each other.

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8. ^{The} An electrically controlled braking system according to claim 6, wherein said brake control apparatus (18) includes a control on/off device for continuing a control of the electrically controlled braking system when predetermined at least one of said plurality of control devices is normal, and stopping the control of said electrically controlled braking system when said predetermined at least one of said plurality control devices is not normal.

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9. ^{The} An electrically controlled braking system according to claim 6, wherein said brake control apparatus includes an abnormality detecting device for detecting that at least one of said plurality of control devices is abnormal.

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10. ^{The} An electrically controlled braking system according to claim 9, wherein each of said plurality

of control devices includes a plurality of central processing units, and said abnormality detecting device includes a CPU abnormality detecting device for detecting that at least one of said plurality of central processing units is abnormal.

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~~11. An electrically controlled braking system according to claim 1, wherein said brake control apparatus includes at least three control devices each of which is principally constituted by a computer.~~

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~~12. An electrically controlled braking system according to claim 1, wherein said brake control apparatus includes at least one control device each of which is principally constituted by a computer, and said electric power source device includes a plurality of electric power sources which are arranged to supply electric energies to each of said at least one control device independently of each other.~~

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~~13. An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a front brake for braking a front wheel and a rear brake for braking a rear wheel, and said brake control apparatus includes a front brake control device for controlling an operation of said front brake and a rear brake control device for controlling said rear brake,~~

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said electric power source device includes a plurality of electric power sources which are arranged to supply electric energies to said front brake control device independently of each other.

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14. ~~The~~ An electrically controlled braking system according to claim 13, wherein said rear brake includes a first rear brake and a second rear brake, and said rear brake control device includes a first rear brake control device for controlling said first rear brake and a second rear brake control device for controlling said second rear brake, said first rear brake control device being connected to one of said plurality of electric power sources while said second rear brake control device being connected to another of said plurality of electric power sources.

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15. ~~The~~ An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a front left brake for braking a front left wheel, a front right brake for braking a front right wheel, a rear left brake for braking a rear left wheel and a rear right brake for braking a rear right brake, and said brake control apparatus includes a front left brake control device for controlling said front left brake, a front right brake control device for controlling said front right brake, a rear left brake control device for controlling said rear left brake, and a rear right brake

control device for controlling said rear right brake, said electric power source device including a front left brake power source and a front right brake power source which are arranged to supply electric energies to said front left and right brake control devices, respectively, independently of each other, and a common rear brake power source arranged to supply an electric energy to both of said rear left and right control devices.

16. ^{The} An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a rotor rotating with a front wheel, a friction member, and an electrically operated front brake actuator for forcing said friction member onto said friction member, and said electric power source device includes a plurality of electric power sources arranged to supply electric energies to ^{electric} said front brake actuator independently of each other.

17. ^{The} An electrically controlled braking system according to claim 16, wherein said electrically controlled brake further two electrically operated rear brake actuators each of which is arranged to force a friction member onto a rotor rotating with a corresponding one of rear left and right wheels, and said electric power source device includes two electric power sources provided for said two rear brake actuators, respectively.

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18. ^{re} ~~An~~ electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes an electrically operated front brake actuator for forcing a friction member onto a rotor rotating with a front wheel, and an electrically operated rear brake actuator for forcing a friction member onto a rotor rotating with a rear wheel, and said electric power source device includes a front brake power source for supplying an electric energy to said front brake actuator and a rear brake power source for supplying an electric energy to said rear brake actuator.

19. ^{re} ~~An~~ electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a plurality of brakes for braking respective wheels of the automotive vehicle, ^{plur. of} said brakes including respective electrically operated electric motors each of which is arranged to force a friction member onto a rotor rotating with a corresponding one of the wheels, said braking system further comprising a plurality of actuator switching devices each of which is disposed between said electric power source device and a corresponding one of said electric motors, each of said actuator switching devices being operable between a connecting state for connecting said electric power source device to the corresponding electric motor, and a disconnecting state for disconnecting

said electric power source device from said corresponding electric motor.

20. ^{The} An electrically controlled braking system according to claim 19, wherein said brake control apparatus includes motor control devices for controlling said electric motors, respectively, and each of said plurality of actuator switching devices includes two switches connected in series with each other, one of said two switches of said each actuator switching devices being turned off when the corresponding electric motor becomes abnormal, the other of said two switches being turned off when the corresponding motor control device becomes abnormal.

21. ^{The} An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a rotor rotating with said wheel, a friction member, and an electrically operated actuator for forcing said friction member onto said rotor, and said brake control apparatus includes a main control device which determines a physical quantity relating to a desired value of a braking force to be produced by said brake and generates a control command representative of the determined physical quantity, and an actuator control device which controls said electrically operated actuator according to said control command and generates a signal representative

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of a physical quantity relating to an actual value of the braking force produced by said brake.

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22. ^{The} An electrically controlled braking system according to claim 21, wherein said actuator control device is spaced from said main control device and disposed on a sprung member of the automotive vehicle such that said actuator control device is located near said actuator, said main control device and said actuator control device have means for data communication therebetween through a local area network (LAN).

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23. ^{The} An electrically controlled braking system according to claim 21, wherein said main control device includes an abnormality detecting device for detecting an abnormality of said actuator control device, on the basis of said signal representative of the physical quantity relating to said actual value of the braking force produced by said brake.

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24. ^{The} An electrically controlled braking system according to claim 1, wherein said electrically controlled brake includes a rotor rotating with said wheel, a friction member, and an electrically operated actuator for forcing said friction member onto said rotor, said braking system comprising an electric circuit in which said actuator and said brake control apparatus are connected to said

electric power source device such that said actuator and said brake control apparatus are connected in parallel with each other, and wherein said switching device is disposed in a common portion of said electric circuit which serves to connect said electric power source device to both of said actuator and said brake control apparatus.

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25. ^{The} An electrically controlled braking system according to claim 24, further comprising a controller switching device which is turned off to disconnect said brake control apparatus from said electric power source device when said brake control apparatus is abnormal, said controller switching device being disposed in an exclusive portion of said electric circuit which serves to connect said electric power source device to only said actuator.

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26. ^{The} An electrically controlled braking system according to claim 25, wherein said controller switching device includes a plurality of switches connected in parallel with each other, and said brake control apparatus includes a plurality of control devices which are principally constituted by respective computers and which correspond to said plurality of switches, respectively, and a switch control device for turning off one of said plurality of switches of said controller switching device

when one of said control devices which corresponds to said one of said plurality of switches becomes abnormal.

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27. ^{The}~~An~~ electrically controlled braking system according to claim 24, wherein said electric power source device includes a plurality of electric power sources, and said switching device includes a main switch provided in said common portion of said electric circuit which includes one of said electric power sources, a plurality of coils which are energized and de-energized to turn on and off said main switch, a plurality of coil connecting circuits for connecting said plurality of coils to said plurality of electric power sources, and a plurality of brake switches which are respectively provided in said coil connecting circuits and which are turned on when said brake operating member is operated.

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28. ^{The}~~An~~ electrically controlled braking system according to claim 24, wherein said electric power source device includes a plurality of electric power sources, and said electrically controlled brake includes a plurality of electrically operated actuators, said brake control apparatus including a plurality of actuator control devices for controlling said plurality of actuators, respectively, said braking system comprising a plurality of electric circuits each of which includes a corresponding one of said electric power sources, a corresponding one of said

actuators and a corresponding one of said actuator control devices, said switching device including a main switch provided in each of said plurality of electric circuits, a coil which is energized and de-energized to turn on and off said main switch, a coil connecting circuit for connecting said coil to said corresponding one of said electric power sources, and a brake switch which is provided in said coil connecting circuit and which is turned on when said brake operating member is operated.

29. ^{the} ~~An~~ electrically controlled brake system according to claim 1, further including ~~(an)~~ mechanically operated brake mechanically operated by said brake operating member, and wherein said brake control apparatus includes a switching mechanism operable between a connecting state in which an operating force applied to said brake operating member upon operation of said brake operating member is transmitted to said mechanically operated brake and a disconnecting state in which said operating force is not transmitted to said mechanically operated brake, said brake control apparatus further including a switching control device which is normally placed in said disconnecting state, and is brought into said connecting state when an electrical abnormality of the electrically braking system takes place.

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